Mark Scored:

KATHMANDU UNIVERSITY
End Semester Examination
August/September, 2017

AUG 2 8 2017

Level : B. Sc.
Year : III

Course : MGTS 301
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date :

SECTION "A"
[20 Q. × 1 = 20 marks]

Encircle the most appropriate answers from the given choices.

1. Microeconomics deals with which of the following?
   a. the total output of an economy
   b. the measurement of a nation's inflation rate
   c. how producers and consumers interact in individual markets
   d. how tax policies influence economic growth

2. The opportunity cost of a particular activity
   a. is the same for everyone pursuing this activity
   b. may include both monetary costs and forgone income
   c. always decreases as more of that activity is pursued
   d. usually is known with certainty

3. If an investment quadruples in value in seven years, the rate of return on the investment is nearest to:
   a. 21.9% b. 29.1% c. 24.6% d. 23.2%

4. An electric power plant uses solid waste for fuel in the production of electricity. The cost Y in dollars per hour to produce electricity is $Y=12 + 0.3X +0.27X^2$, where X is in megawatts. Revenue in dollars per hour from the sale of electricity is 15X - 0.2X2. Find the value of X that gives maximum output.
   a. 15.64 MW b. 64.15 MW c. 35.40 MW d. 45.18 MW

5. A company produces transmission gears used by several farm tractor manufacturers. The base cost of operation is $596,700 per year. The cost of manufacturing is $18.40 per gear. If the company sells the gears at an average price of $37.90 each, how many gears must be sold each year to break even?
   a. 15,740 b. 15,740 c. 30,600 d. 32,430

6. Four alternatives for a manufacturing process have annual benefits and costs as shown.

Alternatives	Benefits	Costs
1	58,000	50,000
2	51,000	41,000
3	47,000	38,000
4	57,000	46,000

   a. 1 b. 2 c. 3 d. 4

7. In present value method one has to account for
   a. interest rate prevalent at a given time
   b. exchange rate prevalent at a given time
   c. sales tax rate prevalent at a given time
   d. both income and sales tax rates prevalent at a given

8. Which one of the following is the cost driver of software?
   a. wing area b. horsepower c. gross weight d. line of codes

9. You are saving up for a big investment in six years. You estimate it will take $14,500 to secure this investment. How much do you need to put into a savings account at the end of each year if the savings account earns 4%? Neglect taxes. Suppose an investor wants to have $10 million to retire 45 years from now. How much would she have to invest today with an annual rate of return equal to 15 percent?
a. $ 2,185 b. $2,375 c. $2,415 d. $2,485

10. In designing a system it is found that the cost of the system was Rs 150,000 and the benefit is Rs 10,000 per month. The interest is 1% per month; the payback period using simple payback period method is
a. 14 months b. 17 months c. 15 months d. 20 months

11. An elevator system for a 20-yr old high-rise office building cost $400,000 when first installed. The system was designed to last 30 years, with salvage at 10% of initial cost. Depreciation is straight line. The allowable depreciation charge per year is:
a. $12,000 b. $13,333 c. $18,000 d. $20,000

12. The primary objective of cost-benefit analysis is
a. to find out direct and indirect cost of developing the information system
b. to determine the tangible benefits of the information system
c. to determine if it is economically worthwhile to invest in developing the information system
d. to determine the intangible benefits of the information system

13. The NPV of the two projects are equal in discount rate of 15%. MARR of the project is 10%. What is the crossover rate of the project?
a. 10% b. 15% c. 5% d. 25%

14. What determines the value of a critical factor?
a. investment planning models b. financial planning models
c. cost planning models d. revenues forecast models

15. Stan Moneymaker has a bank loan for $10,000 to pay for his truck. This loan is to be repaid in equal end of month installments for five years with a nominal interest rate of 12% compounded monthly. What is the amount of each payment?
a. $222 b. 333 c. $234 d. $200

16. The estimated value of a property at the end of its useful life is
a. Market value b. Salvage value
c. Book value d. Original value

17. A piece of equipment used in a business has a basis of $50,000 and is expected to have a $10,000 salvage value when replaced after 30,000 hours of use. Find book value after 10,000 hours of operation
a. $40,000 b. $50,000 c. $36,700 d. $13,300

18. The period of time (years) that results in the minimum equivalent uniform annual cost (EUAC) of owning and operating an asset is called:
a. Useful life ` b. Physical Life c. Ownership life d. Economic life

19. Suppose that a market survey has shown that the best competitor's selling price is $30 per assembly. If a profit margin of 20% is desired, determine a target cost for the throttle assembly.
a. $ 30.25 b. $24.75 c. $ 25 d.$ 30.55

20. Suppose that an aircraft manufacturer desires to make a preliminary estimate of the cost of building a 600 MW fossil fuel plant for the assembly of its new long distance aircraft. It is known that a 200 MW plant cost $ 100 million 20 years ago when the appropriate cost index was 400, and that cost index is now 1200. The cost factor for a fossil power plant is 0.79. What is the current cost of a 600 MW plant?
a. $714 million b. $ 600 million c. $ 1200 million d. $ 300 million

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SECTION "B"

Attempt *ALL* the questions. Missing parameters can be assumed suitable.

1. a. Assume that your employer is a manufacturing firm that produces several different electronic consumer products. What are four nonmonetary factors (attributes that may be important when a significant change is considered in the design of the current best selling product? **[2]**
   b. Classify each of the following cost items as mostly fixed or variable. Give appropriate reason as well. **[2]**
   Raw materials Direct labor Depreciation Property taxes
   c. A plant operation has fixed cost of $2,000,000 per year, and its output capacity is 100,000 electrical appliances per year. The variable cost is $40 per unit, and the product sells for $90 per unit.
      i. Construct the economic breakeven chart and determine the breakeven quantity and dollar breakeven point.
      ii. Compare annual profit when the plant is operating at 100% capacity. Assume that the first 90% of capacity output is sold at $90 per unit and that the remaining 10% of production is sold at $70 per unit **[3]**
   d. You are planning to build a new home with approximately 2,000-2,500 gross square feet of living space on one floor. In addition, you are planning an attached two-car garage (with storage space) of approximately 450 gross square feet. Develop a cost and revenue structure for designing and constructing, operating (occupying) for 10 years, and then selling the home at the end of the 10^{th} year. **[3]**

2. a. Tesla Motors manufactures high-performance battery electric vehicles. An engineer is on a Tesla committee to evaluate bids for new-generation coordinate-measuring machinery to be directly linked to the automated manufacturing of high-precision vehicle components. Three bids include the interest rates that vendors will charge on unpaid balances. To get a clear understanding of finance costs, Tesla management asked the engineer to determine the effective semiannual and annual interest rates for each bid. The bids are as follows:
   Bid 1: 9% per year, compounded quarterly
   Bid 2: 3% per quarter, compounded quarterly
   Bid 3: 8.8% per year, compounded monthly
      i. Determine the effective rate for each bid on the basis of semiannual periods.
      ii. What are the effective annual rates? Evaluate the bid based on the EAR.
      iii. Which bid has the lowest effective annual rate? **[3]**
   b. A loan of $10,000 is to be repaid over a period of eight years. During the first four years, exactly half of the loan principal is to be repaid (along with accumulated compound interest) by a uniform series of payments of A_1 dollar per year. The other half of the loan principal is to be repaid over four years, with accumulated interest, by a uniform series of payments of A_2 dollar per year, If i=9% per year, what are A_1 and A_2? **[4]**
   c. An apartment complex wishes to establish a fund at the end of 2004 that, by the end of the year 2021, will grow to an amount large enough to place new roofs on its 39 apartment units. Each new roof is estimated to cost $2,500 in 2019, at which time 13 apartments will be reroofed. In 2020, another 13 apartments will be reroofed, but the unit cost will be $2,625. The last 13 apartment will be reroofed in 2021 at a unit cost of $2,750.
   The annual effective interest rate that can be earned on this fund is 4%. How much money each year must be put aside (saved), starting at the end of 2005, to pay for all 39 new roofs? State any assumptions you make. **[3]**

3. a. A remotely situated fuel cell has an installed cost of $2,000 and will reduce existing surveillance expenses by $350 per year for eight years. The border security agency's MARR is 10% per year.
   i. What is the minimum salvage (market) value after eight years that makes the fuel cell worth purchasing?
   ii. What is the fuel cell's IRR if the salvage value is negligible? [5]

   b. Two mutually exclusive alternatives are being considered for the environmental protection equipment at a petroleum refinery. One of these alternatives must be selected. The estimated cash flows for each alternative are as follows: [5]

	Alternative I	**Alternative II**
Investment	$20,000	$38,000
Annual operating expenses	$55.00	$4,000
Salvage (market) value	$1,000	$4,200
Useful life	5 years	10 years

   i. Which environmental protection equipment alternative should be selected? The firm's MARR is 20% per year.
   ii. Assume the study period is shortened to five years. The market value of Alternative B after five years is estimated to be $15,000. Which alternative would you recommend?

4. a. Casio Systems is purchasing a new bar code scanning device for its service center in San Francisco. The table that follows lists the relevant cost items for this purchase. The operating expenses for the new system are $10,000 per year, and the useful life of the system is expected to be five years. The salvage value for depreciation purpose is equal to 25% of the hardware cost.

Cost item	Cost
Hardware	$160,000
Training	$15,000
Installation	$15,000

   i. What is the book value of the device at the end of year three if the SL depreciation method is used?
   ii. Suppose that after depreciating the device for two years with the SL method, the firm decides to switch to the double declining balance depreciation method for the remainder of the device's life (the remaining three years). What is the device's BV at the end of four years? [5]

   b. In a replacement analysis for a vacuum seal on a spacecraft, the following data are known about the challenger: the initial investment is $12,000; there is no annual maintenance cost for the first three years, however, it will be $2,000 in each of years four and five, and then $4,500 in the sixth year and increasing by $2,500 each year thereafter. The salvage value is $0 at all times, and MARR is 10% per year. What is the economic life of this challenger? [5]

5. a. In the past, the A fram Foundation has awarded many grants to improve the living and medical conditions of people in war-torn and poverty-stricken countries throughout the world. In a proposal for the foundation's board of directors to construct a new hospital and medical clinic complex in a deprived central African country, the project manager has developed some estimates. These are developed, so she states, in a manner that does not have a major negative effect on prime agricultural land or living areas for citizens.

Award amount: $20 million (end of) first year, decreasing by $5 million per year for 3 additional years; local government will fund during the first year only
Annual costs : $2 million per year for 10 years, as proposed
Benefits : Reduction of $8 million per year in health-related expenses for citizens
Disbenefits : $0.1 to $0.6 million per year for removal of arable land

Use the modified B/C methods to determine if this grant proposal is economically justified over a 10-year study period. The foundation's discount rate is 6% per year. Compare the grant proposal by taking disbenefits $0.1 million and $0.6 million separately and comment on the findings. **[5]**

b. The managers of a company are considering an investment with the following estimated cash flows.

MARR	:	15% per year.
Capital investment	:	$30,000
Annual revenues	:	$20,000
Annual expenses	:	$5,000
Market value	:	$1,000
Useful life	:	5 years

The Company is inclined to make the investment; however, the managers are nervous because all of the cash flows and the useful life are approximate values. The capital investment is known to be within ±20%. Annual expenses are known to be within ±20%. The annual revenue, market value, and useful life estimates are known to be within ± 20%. Analyze the sensitivity of PW to changes in each estimate individually. Based on your results, make a recommendation regarding whether or not they should proceed with this project. Graph your results for presentation to management. **[5]**

6. Write short notes on (*ANY TWO*) **[5]**
   a. Purpose of Cost estimation
   b. Cross over rate
   c. Depreciation